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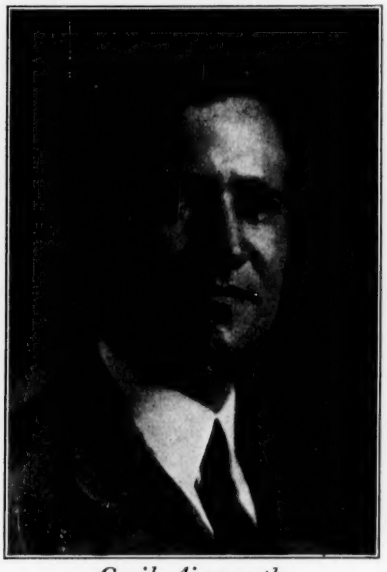
Cyril Ainsworth Appointed Assistant Secretary of American Standards Association

Safety Engineer of American Standards Association succeeds F. J. Schlink, Assistant Secretary for the past eight years

Cyril Ainsworth, Safety Engineer on the staff of the American Standards Association for the past year, has been appointed Assistant Secretary of the Association to succeed F. J. Schlink, whose resignation was recently announced.

Mr. Ainsworth came to ASA from the Department of Labor and Industry of the State of Pennsylvania, where he was Director of the Bureau of Industrial Standards. Since that time he has been in charge of the entire safety code program of the Association, supervising the Association's 43 safety code projects. He is also secretary of the committees in charge of the codes for walkway surfaces and for grandstands.



Cyril Ainsworth

One of the most important phases of Mr. Ainsworth's work with ASA has been the promotion of the use of the national codes through cooperation with the groups concerned with accident prevention work, state industrial associations, technical and trade associations, casualty insurance organizations, and state commissions.

During the past year he has made a number of addresses on safety codes and related matters before the Safety Engineering Section of the National Safety Congress, the Safety Engineers Club of Baltimore, the Greater New York Safety Conference, the Safety Engineering Class of the University of Pittsburgh, and the Metropolitan Chapter of the American Society of Safety Engineers.

Several state commissions have sought his aid in helping to bring their accident prevention work into line with the national safety code program. For example, he was asked to advise the Department of Labor of Nebraska in the development of a state program of safety codes. The final action of Nebraska was the adoption of a series of codes based upon the national codes approved by ASA instead of a wholly independent set of regulations as had been contemplated at first.

Mr. Ainsworth studied mechanical engineering at Swarthmore College and at Carnegie Institute of Technology. His industrial experience began with the Pennsylvania Railroad where he spent three years as a member of the Engineering Corps in the Engineering and Construction Department. He was for two years safety inspector of the United Gas Improvement Company, Philadelphia. In 1922 he joined the Department of Labor and Industry of Pennsylvania as safety engineer of the Industrial Board. He became successively secretary of the Industrial Board, director of the Bureau of Inspection, and director of the Bureau of Industrial Standards.

Prior to his joining the staff of the American Standards Association, he served on 15 national safety code committees and was able to bring to these committees the experience gained through the enforcement and development of safety codes by a governmental agency.

It was during Mr. Ainsworth's term of office as director of the Pennsylvania Bureau of Industrial Standards that the use of national safety codes by the Pennsylvania Department of Labor and Industry was first undertaken. This policy has resulted in the use, in whole or in part, of approximately 15 national safety codes.

Mr. Ainsworth's experience both in the administration of safety codes in the Pennsylvania Department of Labor and Industry and in the establishment of safety codes as a member of the American Standards Association sectional committees has been of great value to him as a member of the ASA staff, being particularly advantageous in his work in furthering use of the codes.

The Fulfillment of a Standardization Program for Coal[1]

by

J. M. Hadley, *Secretary*
Standardization Division, American Mining Congress

Since the memory of man runneth not to the contrary standards have been evolved. Common usage has developed practices, weights, measures, standards of value, and standards of quality for commodities, which have come into general use. Some have been codified, others discarded. The indictment that standardization means stagnation, so frequently heard in this generation, hardly holds. Quite the reverse is true, for standardization is dynamic, not static. It does not mean standing still, but rather moving forward. A standard of practice or of equipment represents the best thought of an industry concerned with its use and furnishes the best possible means to eliminate wastefulness and promote efficiency. The desirability of revision is granted, for, as better methods are brought forward and as better machinery and equipment are developed, new standards will take the place of old.

The mining industry started its standards program shortly after the close of the World War. The American Mining Congress organized the Coal-Mining Branch of its National Standardization Division (under the chairmanship of Col. Warren R. Roberts) to standardize coal-mining methods, practice, and equipment. The program presented was an ambitious one, which called for sectionalizing coal-production methods. This was brought about through the development of 17 major projects, under the Coal Branch, each properly subdivided and headed by a man who had done conspicuous work along the line under consideration. The idea immediately took root, some 300 men joined in the campaign, and amazing results have followed. Committees actively undertook such projects as a standard code for installing and using electrical equipment underground, standards for drainage, ventilation, tracks, wire rope, and many others.

Consisting largely of coal-mine operators, the original committees had only a smattering of representatives from the manufacturing field. It was early found, however, that many other factors were involved, if the proposed program was to be successful. Immediate reorganization of the committees was undertaken to include representatives of the manufacturers, whose equipment was involved and whose cooperation was essential if the work was to go forward. Further, it was found that the Government was no small factor in the field. Certain recommendations had already been evolved by the United States Bureau of Mines, which were held to tenaciously. When the work finally got under way, the Coal-Mining Branch was organized to include (1) the coal-mine operator, (2) the manufacturer of coal-mine equipment, (3) United States Government, (4) representatives of all national associations, including safety organizations, insurance groups, mechanical, electrical, and civil engineering groups, and (5) a small number of nationally known consulting engineers for the coal industry.

Correlating Committee Organized

The work went forward rapidly from that point. Regular meetings were called at convenient places, and through much consultation and correspondence, potential standards were issued and sent to the coal-mining industry. National attention was attracted to them. The American Engineering Standards Committee, later to become the highly representative and effective American Standards Association, issued an invitation to this group to present its standards under, and by authority of, the national standardizing body. As a clearing-house for mining standardization, the American Standards Association created the Standardization Correlating Committee. This committee has proved to be the battle ground from which eventually has arisen the group of coal-mining standards that are today the pride of the American Mining Congress, their promulgator and sponsor, and the industry they serve.

From the welter of sweat, brains, and determination, and through the cooperation of all these agencies, the industry now has national standards representing the following subjects, approved by the highest standardizing bodies:

Safety Rules for Installing and Using Electrical Equipment—1926 (U. S. Bureau of

[1] An abstract of an article in the December, 1930, issue of the *Mining Congress Journal.*

Mines and American Mining Congress, joint sponsors)

Coal-Mine Drainage—1927 (revised 1930)

Tracks, Signals, and Switches—1927

Wire Rope—1927

Miscellaneous Outside Coal-Handling Equipment—1926

Ladders and Stairs for Mines—1928

Ventilation—1929 (completed but not under ASA procedure)

Cooperating with other organizations which have acted as the sponsors, the Standardization Division has assisted in the bringing out of two additional standards that have far-reaching effects:

Recommended Practice for Rock Dusting, approved in 1928, A.I.M.M.E.

Recommended Practice for the Use of Explosives in Bituminous Coal Mines, Mine Inspectors' Institute of America, approved in 1930

Many projects remain to be completed and many more have been proposed for consideration. Continually, new projects are suggested to the division for development. Standards covering the preservative treatments of mine timbers and a standard safety code for coal-mine transportation are now nearing completion. Added to all these, committees are engaged in the development of a standard classification of coals with the American Society for Testing Materials as sponsor; and specifications for locomotives for coal mines, including trolley, storage battery, and combination types, with the American Mining Congress and the National Electrical Manufacturers Association acting as joint sponsors.

The activities of the Mining and Loading Section of the Coal-Mining Branch of the National Standardization Division have had especially far-reaching effects. This section in the early stages in mechanical loading development found little that would lend itself to standardization, and therefore confined activities to the collection and dissemination of information regarding successful mechanical loading installation. Out of this activity grew the National Committee on Mechanized Mining now making an extensive study of the subject.

For the time being, therefore, the Mining and Loading Section became inactive and subordinate to the National Committee on Mechanized Mining, but it was arranged that, as the work progressed, and as mechanization became universal, certain items that showed possibilities of standardization should be referred to the section for consideration, development, and action. The point has now been reached where it is apparent that several such items have presented themselves. These are:

Standardizing new powder cartridge sizes
Drill-hole sizes
Conveyor pans
Conveyor sprockets
Conveyor chains

Two new projects to be undertaken in the near future are of particular importance. The first involves the design and details of construction for coal-mine cars, and the other fire-fighting and fire-prevention methods. In the case of the former, the desire for this standard has long been felt, evidencing itself first several years ago. It resulted in the organization of a committee to do the work. Many obstacles intervened; perhaps both manufacturers and operators not originally connected with the movement feared that it was proposed to limit individuality of structural features. Such was not and is not now the case. The hope is merely for some interchangeability of parts and possibly a decrease of car cost. In this case, rather than call it standardization, we might use the term "abandonment." All will agree that some designs could be abandoned to the benefit of all concerned. The spread of mechanization and the general movement to increase underground operating efficiency demand new types and sizes of cars. Now, it is believed, is the time to arrive at some general standards which new installations can follow. If general agreement cannot be reached to standardize the cars themselves, it is certainly worth while to consider the type of standardizing that has been done in automobile manufacture, as evidenced by the following quotation regarding the important standardization effected in this branch of industry. This will suggest immediately to the practical engineer the tremendous possibilities for economies, if only some of the elements of construction of coal-mine cars can be uniformly standardized:

> "The automobile industry is justly considered to be the example *par excellence* of mass production through standardization. The intercompany, or group phase, of this great undertaking, has been carried out in most part through the Society of Automotive Engineers. Their work falls chiefly under two heads: dimensional details and parts to secure interchangeability.
>
> "This includes hundreds of such details as ball bearings, rims, brake linings, gears, brushes, electrical fittings, cap screws, clamps, sprockets, carburetor flanges, gage connections, piston rings, keys, wrenches, spark plugs.

"Specifications for materials which the manufacturer, or the part manufacturer, buys. Under this heading is a group of important alloy steels (which are so numerous that a special numbering system has been devised for convenience in referring to them) specifications for leather substitutes, brass, bronze, copper, zinc, aluminum, and light metal alloys.

"In this large group of standards the idea has been followed throughout that, so far as economically justified, there should be standardization as between companies, of parts, supplies, and materials which are used by the manufacturers, so as to provide as far as possible a common market in which such supplies and parts may be purchased. There has been no effort to standardize cars as such. In fact, there has been a consistent effort throughout to avoid standardizing general designs or any authentic feature, such as car effects, which are a natural basis of competition. Only specifications are standardized that promote interchangeability, eliminate unnecessary variety, facilitate production or servicing, promote safety, or advance uniformity in testing, nomenclature, or operating requirements. Methods of testing are established to aid in disseminating knowledge and in comparing performances. The specifications are not intended to limit individuality unnecessarily.

"Some years ago a group of 50 responsible engineers in the industry cooperated in making an estimate of the economic savings to the industry through such standardization activities. The final figure in the estimate was a saving of 15 per cent of the total value of the products, which at that time indicated a saving of $750,000,000 a year."

The "run-of-mine" day at a coal operation witnesses the use of hundreds of standards that are not thought of as such. Several important standards cover bolts, cement, concrete reinforcing spiral steel rods, fire-hose and fire-hose couplings, machine tools, motor ratings, pipe flanges and fittings, pipe threads, rails, rivets, screw threads for bolts, machine screws, nuts and commercial tap holes, shafting and wire. Seldom, if ever, are these recognized as representing the conscious effort of some organization or group of organizations to standardize. These, as well as the mining standards enumerated above, represent a barrage of heavy artillery that can be effectively laid down to make the enemy position of high production cost untenable. These missiles of modern business warfare should be put to use intensively and intelligently. Many others should be created to follow up. Without many of the standards being used today, the condition of industry would be chaotic. Wasteful variety in design and construction of mining equipment is inexcusable and expensive. Wasteful and unsafe practices are still more expensive and even less excusable. The movement is naturally away from such waste, as a brief look in retrospect at mining conditions will quickly reveal. This movement is being accelerated by the activities of 300 men who are earnestly engaged in the activity of creating coal-mining standards.

The fulfillment of this great program for coal lies in the general adoption and use of the standards by every single coal company in the country, and the interest and assistance of these companies in the formulation of new ones as needed.

Application of Mine Safety Rules Would Result in Savings

The necessity for an effective group of recognized safe practices for mines is emphasized by a statement of W. H. Forbes, assistant engineer at the U. S. Bureau of Mines Safety Station in Vincennes, Indiana, which appears in the February 28 issue of *Science News Letter.*

Mr. Forbes states that a large amount of money would be saved through decreased compensation and reduction of labor turnover in mines if as much importance were attached to a worker's disobedience to safety rules or orders as to his reporting late for work or leaving the shop before quitting time.

Mr. Forbes cites instances in which accidents have been materially reduced solely on the emphasis placed on safety rules and individual responsibility.

The various safety codes for mines which have been approved by the American Standards Association are largely the kind which could very definitely be used in the way indicated by Mr. Forbes. They contain basic standards of procedure and safe practice which can be carried out by the workmen under the supervision of the mine foreman and undoubtedly, if properly applied, would save thousands of dollars in reduced accident costs as well as bringing about savings in human suffering.

Some of the mining codes of this character are Safety Rules for Installing and Using Electrical Equipment in Coal Mines (M2-1926), Construction and Maintenance of Ladders and Stairs for Mines (M12-1928), Rock Dusting of Coal Mines (M13-1925), Use of Explosives in Bituminous Coal-Mines (M14-1930), Safety Code for Coal Mine Transportation (M15), and Fire-Fighting Equipment in Metal Mines (M17-1930).

The Development of Standards for Use in Metal Mines[1]

by

Lucien Eaton, *Mining Engineer*
Rhodesian Selection Trust, Inc.

Even in these days, when the standardization movement has had so much publicity and has made so much progress in this country, there are people who consider it a new fad. They do not realize that, consciously or unconsciously, standardization has been practiced by humanity ever since mankind emerged from barbarism, and even before that time. The standardization of certain sounds to carry certain meanings was the origin of speech, and the standardization of certain marks to represent those sounds was the basis of communication by the written word. Standardization of currency and of weights and measures raised the trade of the world from barter and exchange to its present high degree of development.

All of these standards—speech, writing, currency, weights and measures, and so on, were developed to a greater or less degree, more or less simultaneously all over the world, and the result, as we all know, is quite confusing. How much simpler foreign travel would be, if we could all speak Esperanto, and all measurements were in the metric system! In much the same way different mining districts have, by reason of their isolation and of the peculiar conditions under which their ores occur, developed their own standards of equipment and of mining methods, not to mention mining terms, and these have become so deep-rooted in the minds of many of the men in each district, that they are considered to be the proper standards to be used under all circumstances. When, however, they are transplanted bodily to another district and a different set of conditions, they are often dismal failures.

If the essential principles of these district standards could be separated from the local variations, which are often due to tradition or are the outgrowth of habit, and if a clearing-house of ideas, as it were, could be established, how much simpler it would be to avoid these mistakes and to profit by the experience of others. Just as we know that Esperanto will never be the universal language, so do we know that international standards in mining are impossible. Nevertheless national standards are possible, and the conditions surrounding metal mining in the United States are so varied that national standards adopted here may be applied with a minimum of change to mining in the rest of the world.

About 30 years ago we attained a high degree of standardization in mining practice and equipment in the narrow veins of high-grade ore in our western states, and from these mines the standards spread to other countries, and are found today in many places here and abroad. Since the veins were narrow, and since it was desirable to break as little of the barren wall-rock as possible, narrow drifts were driven, and the cars were made high and narrow to fit the drifts. Small tonnages only of ore were required, and tramming was done by hand in one-ton cars. Ore-passes and chutes were made small to fit the cars, and worked satisfactorily, because the stopes also were small, and the ore was broken in small pieces. Shafts, slips, and cages were also small, for the small tonnage required could easily be hoisted from the shallow depths mined.

With the exhaustion of the narrow veins of high-grade ores, attention was turned to the large, low-grade ore-bodies, of which the porphyry copper mines are the most conspicuous examples. In order to mine these ores successfully large tonnages had to be produced at low cost, and larger equipment was needed. In order to reduce cost of equipment as well as of production, it was early seen that both equipment and mining methods must be standardized, and much has been accomplished along these lines.

In the Lake Superior district high taxation and low prices for iron ore and copper have compelled the operators to work along the same lines within the limits imposed by the conditions under which their mining must be carried on. The same trend is apparent in other mining districts, as is seen in Birmingham, Alabama, and in Southeastern Missouri.

In the deep mines of the world, even though the ore may be mined in narrow veins or reefs, large units of production and transportation must be used, and a high degree of standardization is required for successful operation.

Probably the highest degree of standardization

[1] A Reprint of an article in the December, 1930, issue of the *Mining Congress Journal.*

in the mining industry is seen in the equipment and practice on surface and underground in the Tri-State Zinc District, and the low costs obtained in that district are largely due to this standardization. Other examples of low costs and high development of standardization are seen on the Witwatersrand and in the diamond mines of South Africa.

The standardization campaign inaugurated and carried on by the American Mining Congress is an endeavor to coordinate the work done in the different districts, so that each may have the benefit of the others' experience, and so that the benefits of uniformity and simplicity in design of equipment and in its use, in so far as local conditions will permit, may be enjoyed by all.

Not content to wait for the development of national standards, many of the large mining companies have developed standards of their own, covering different phases of the mining operation. This movement was stimulated by the campaign for industrial safety, and it was found that success in accident prevention was so closely connected with economy of operation that the adoption of operating standards, even though of a temporary character, was imperative.

First Safety Standards

Probably the first attempt at a national standard in metal mining was the safety code drawn up by representatives from the national societies some twenty years ago. Although this code was not to my knowledge formally adopted, nevertheless it has been the basis of most of the safety rules of the large mining companies. Of late, however, because of the close connection between safety and economical practice, it has been the custom to incorporate the necessary safety provisions in the standards of recommended practice for the different kinds of mining work.

Although it was one of the first subjects to be studied, it is only recently that a satisfactory standard code for fire prevention in metal mines and for mine-rescue work has been completed. This standard has been adopted by the American Standards Association, and is now national standard practice. Standards of practice have also been drawn up for Installing and Using Electrical Equipment in Metal Mines, and are in process of adoption by the Association.

In 1928 a standard of recommended practice for Mechanical Loading Underground was adopted by the American Engineering Standards Committee, predecessor of the American Standards Association. A standard for Underground Transportation was also drawn up and adopted, but the scope of this is to be enlarged, and recommendations of practice are to be added before it is submitted to the Standards Association for adoption.

Preliminary reports have been prepared on standardization of practice in Methods of Sampling, Recording Geological Data, and Estimation of Ore-Reserves, on Metal Mine Accounting, Drills and Drill-Steel, Mine-Timbering and Timber-Treatment, and Ventilation, and others are in process of preparation. When completed, these standards will form a skeleton, upon which the development and equipment of a metal mine can be based with a minimum of waste in money and effort.

Standard Mining Practices

In actual mining practice changes are going on all the time. It is always the endeavor to establish a standard cycle of operations for each twenty-four hours, or for each shift. In drifting it may be desired at first to drill and blast and muck out one round once in twenty-four hours. By speeding up the drilling and mucking, deeper and deeper rounds are drilled, up to the limit of practicability, and then a shorter round per shift is sought, until finally the limit seems to have been reached in two rounds per shift. Standard rounds for drilling in drifts, raises, and shafts have been worked out for different kinds of ground and different sizes of opening, and have been given a good deal of publicity, but new ideas are being tried that may make possible deeper holes and larger blasts. The changes in practice are all toward larger units and more rapid progress. Reduction in the number of different ways of drilling a round, in the difference of spacing, direction, and depth of holes, will lead to greater efficiency on the part of the miners, and to greater speed in development. Greater speed in development means that development need not be kept so far ahead of stoping, or that safer and better methods of stoping, which require more elaborate development, may be made possible.

By the adoption of standard methods of drilling and blasting, of standard sizes of stopes, standard spacing and sizes of pull-holes, bulldozing chambers, chutes, and so forth, the work of development and of mining may be divided among groups of men, each of whom is especially skillful along his own lines, and great economies will result. It is not to be expected that such matters can be standardized in such a way that they will suit all conditions, for it is most unusual, even in the same district, to find two mines in which conditions are exactly alike. Mining is an art, not an exact science, but the tools with which we work and the manner in which they should be used can be standardized to a great extent. The application of those standards to the problem in hand must be left to the judgment of the engineer or operator.

Standardization in the Wanderer Machine Tool Works at Siegmar, Germany

by

F. J. Schlink[1]

The Wanderer Works at Siegmar is one of the leading machine tool factories in Germany, the factory area used for machine tool manufacture being about 183,000 sq ft and the normal number of employees in this department being about 600. The Works at Siegmar is one of two works of the Wanderer Company, the other being at Schonau.

The firm's factory standards include many of the standards of the Deutscher Normenausschuss (the German national standardizing body) which are used just as they have been published by that organization. Others have been especially edited to include Wanderer identification numbers, or to omit details of sizes not needed in the factory's production. The design and production work of the factory is adjusted with an astonishing degree of satisfaction to the Dinorm (Deutscher Normenausschuss) system of limits for fits, and the working gages used in the factory are numbered to correspond with the identification system worked out by the Normenausschuss. It was learned upon inquiry that the Dinorm scheme, which has been referred to in a paper, "International Unification of Standard Fits," (ASA BULLETIN, September, 1930, and *Mechanical Engineering*, October, 1930) by John Gaillard, has worked so well that no change, even in minor points, seems to be required. The completeness with which such a national system of standard fits is adapted to the problem of machine tool manufacture is impressive, to say the least, in the light of the fact that an American standard system of fits approved in 1925 by ASA has been introduced only to a very small extent into the manufacturing practice of our industry. The basic hole system is used almost exclusively. A specially designed truck has been developed to carry gages from the central stores to the point where inspection of a large number of parts is to be carried out.

On the purchase of materials, DIN Handbook 4 (Standards for Materials) is used. This is a 180-page handbook, providing a compilation of all the German standards of interest to engineers and purchasing agents concerned in the procurement and testing of materials for manufacture, including sections on testing materials, on steel and iron, rolled and drawn steel, non-ferrous metals, semi-finished non-ferrous products (plates, strips, tubes, sections, wire, automobile body moldings, and wire for electrical engineering uses). This material must, however, be amplified by considerable additional detail in order to be applied effectively to the procurement problems of the factory. The standards of the American Society of Automotive Engineers are used to some extent also by this firm, but not directly in purchase. They form rather a part of the technical background for the practical purchase standards used by the company in the procurement of its metal supplies.

Hardness Testing Standards Needed

An interesting suggestion was made by Dr. Winklhofer, in charge of the laboratories in this firm, that practical control work in the factory showed a need for a more extended development of standards in the field of hardness testing. It was felt that national standardization, of a considerably wider range, of concepts and methods in this field would be of distinct industrial service. Only the Brinnell method has been so far dealt with. (The situation is about the same also in other countries.) The DIN notch test for impact strength is used extensively and regarded as a very satisfactory fundamental standardization. The lack of a wide range of published standards available for use in purchasing ordinary materials used in factory operations—semi-finished products, metal stock, and the like—increases the difficulty of the problem of factory procurement. Lacking such standards, purchase on the basis of sample is necessary, not because this method is preferred, but because pressure of routine makes it impossible to develop specifications to the extent needed, and such specifications do not appear to be available from any other quarter in a form suitable to European conditions.

Excellent use is made in the testing of this firm's product of the standard methods of testing the accuracy of machine tools developed

[1] While he was in Germany last summer, Mr. Schlink visited the Wandererwerke at Siegmar, near Chemnitz, Germany, for the purpose of studying its standardization department. He was assisted by Mr. Junginger, one of the officers, and Dr. Winklhofer, in charge of laboratories, in securing the information presented in this article.

by Professor Schlesinger at the Engineering Institute at Charlottenburg, Germany. Both machine-tool producing and machine-tool consuming industries are enthusiastic about these methods, and as indicative of the German tendency to adhere in their production practice to well-developed standards it is said that all the better machine-tool manufacturers use these standard methods in regular control of their production.

A recent development of the German standardization work is in the standards for laboratory apparatus (DIN Denog). These, the Wanderer Works finds, work very well as purchase specifications for laboratory equipment. Although they are only one year old, they have been found already to be very satisfactory in practical use. They cover such items as chemical thermometers of various types, watch glasses, Erlenmeyer flasks, stop-cocks, capillary glass tubing, glass funnel tubes, and safety tubes, helical condensers, desiccators, and glass drying towers.

Motors supplied for installation on German machine tools are said to be generally interchangeable as to spacing of holes and shaft height, length, and diameter. There are a few of the smaller firms, however, which do not follow the national standards on these items.

New Regulations Included in Federal Specifications

In a recent proposed revision of Federal Specification 643a for Graham Flour, a clause not hitherto found in the specifications has been noted under the section applicable to purchases for the Navy. This clause, which may be of interest to many concerned with the purchase of material, either under brand name, or under standard specification requirements, states:

> "Bidders offering material under brand names must signify that the material meets the specifications in all respects; otherwise, such bids can be considered only as alternate bids offering material at variance with the specifications."

The specification does provide, with respect to labeling, for the plain printing or stenciling on each outer sack, on one side only, with the total net weight, nature of contents, name of contractor, number of contract, and date of milling or packing; and the use of the brand name of the manufacturer or distributor is permitted on the outside of the sack, provided such use is in conformity with the Federal Food and Drugs Act.

Section I, entitled Notes, included in all Federal Specifications, has contained a paragraph stating, "This specification governs all United States Government purchases of this commodity." This statement is not literally true, however, regarding specifications for provisions, since, when authorized, commodities may be purchased by brand name for resale in sales commissaries of the Army, Navy, and Marine Corps, these purchases being distinct from those made for Government consumption. Hereafter this paragraph will appear in federal specifications for foodstuffs only in the following modified form:

> "This specification governs all United States Government purchases of this commodity, except as to articles purchased under specific brand names and not under specification requirements, where such purchases for resale purposes are duly authorized."

This change was approved by the Federal Specifications Board at its meeting of February 3, 1931. The above modification does not, however, affect the Navy Department requirement wherein bidders offering material under brand names, in competition with purchases made under the specification, must signify that the material meets the specification.

The following paragraph also commonly appears now in federal specifications:

> "It is believed that this specification adequately describes the characteristics necessary to secure the desired material and that normally no samples will be necessary prior to award to determine compliance with this specification. If, for any particular purpose, samples with bids are necessary, they should be specifically asked for in the invitation for bids, and the particular purpose to be served by the bid sample should be definitely stated, the specification to apply in all other respects."

It is stated by Captain Fellows, vice-chairman of the Federal Specifications Board, that this paragraph is included in order to discourage the use of samples prior to the award of the bid because it is believed that specifications should be sufficiently explicit to make the use of samples unnecessary except in cases where some factor (particularly of an intangible nature such as flavor or odor) is incapable of definite description. In all cases in which samples are submitted, moreover, the particular purpose to be served by the sample must be stated in order that the specifications will not lose their significance in regard to other factors or requirements set forth therein. Needless to say, this provision also serves to prevent the unnecessary expense to bidders which is involved in the furnishing of samples.

A Test Code for Mechanical Refrigerators as an Aid to Purchasers

The importance of the development of a test code for refrigerators was pointed out recently in an address by Charles H. Roe, of the Electrical Testing Laboratories, Inc., before the Home Service Subcommittee of the Women's Committee of the National Electric Light Association. Mr. Roe, who is chairman of the ASA Sectional Committee on Standards and Specifications for Refrigerators (B38), emphasized the need for standard test methods which would permit comparative laboratory studies of those qualities of refrigerators which are important to the user. The following is extracted from Mr. Roe's address:

Some of you may think that a test code designed for use by a laboratory is a kind of high-brow, academic affair of no practical value to you in your work; you may have thought I should be talking to you instead about little radio dials for regulating the internal temperatures or about the elevation of the refrigerator on stilts so Mrs. Householder can sweep underneath. So let me tell you some of the things that probably have been determined in some of the testing laboratories to which you have access and that certainly can be determined if you wish to spend the money and the time to obtain them.

Internal Temperatures—Since a refrigerator is designed to refrigerate, it seems elemental that measurements of temperature should be made as a basis of comparison. The objection is frequently made, however, that measurements of temperature in a laboratory in Chicago do not mean anything to the purchaser of the same refrigerator who wishes to install it in New Orleans or Seattle. The answer is that results of laboratory tests are better for that purpose than anything else and that, intelligently used, the results of laboratory tests do permit a judgment to be made, as between various kinds of refrigerators, of their respective merits in terms of the average of all. For example, it might not be of so much interest to the purchaser in New Orleans or Seattle that Refrigerator "C" had an internal temperature of 37 deg in the laboratory in Chicago, but if he knew that the average of all other refrigerators tested under the same conditions was 39 deg, he would be safe in assuming that Refrigerator "C" under the conditions represented in the laboratory was built to produce lower temperatures than the others. Internal temperature measurements can be made at one or more standard temperatures of the room in which the refrigerator is placed. In this way it is possible to obtain not only an idea of what the machine will do at any given temperature but also to find what its ultimate capacity may be. The machine operating continuously is doing its utmost. The limit of its capacity is reached at that room temperature when the automatic devices compel the refrigerator to operate continuously.

Energy Consumption—Along with the first cost of an electric refrigerator the consumer wishes to weigh the cost of operation. In too many cases the best information at command is that Mrs. Jones has one and that her electric bills are so much per month in the summer time. If the power company or anyone else wishes to know which among a group of different makes of refrigerators is the most economical in operation, and which the least, the only practical way is to test them in the laboratory under identical conditions and compare one with the other. It should not be understood by anyone that laboratory tests of this kind are intended to gage the amount of electricity the various refrigerators will use in the home. In the first place, the requirements of each home are different and, in the second place, there is no way in the laboratory to reproduce those home conditions. The laboratory test, however, permits the comparison of one refrigerator with another when they are both operated under the same circumstances. The only substitute for such laboratory tests would be the installation of a recording meter upon each one of a great many refrigerators in service so as to obtain an average among a great many homes. The laboratory test is cheaper, more direct, and in many respects is just as satisfactory. As mentioned above under "Internal Temperatures," measurements of energy input can be made at different room temperatures in order to see what the power demands are and what would be the relative cost of operation with different prevailing temperatures.

Frequency of Operations—The frequency of operations as determined by the number of starts and stops in 24 hours is of interest for several reasons. In some installations the residents are aware of the starting periods because the motor and the wiring may be such that a flicker occurs in the lights at such times. Although most refrigerator motors operate very quietly, the starting and stopping of many of

them may be perceptible to nervous persons sensitive to slight noises. In such cases the frequency of operation becomes of some importance. From an engineering point of view, the frequency and duration of operations are related to the reserve capacity of the machine. As noted above, a machine operating continuously is running at full capacity and has no reserve. Tests to determine frequency of operation can be made under various conditions as may be required.

Durability—Fully as important as the first cost and the cost of operation is the relative durability of the electric refrigerator. However, this is a matter most difficult of determination. It is possible to make judgments based upon life tests of the mechanical units and upon the cabinets under various adverse conditions, but there are no comprehensive data of this kind generally available. Here, as in many other cases, Time is the great testing engineer, but it is always possible that ways can be found, in answer to a demand, to provide reliable information on durability.

Test Code Would Aid User

Mr. Roe also asked for assistance in determining the important elements to be included in a test code. He listed the following as the features of a refrigerator to be considered: attractive appearance, economy in use of electricity, cleanliness of mechanism, freedom from servicing needs, elevation on legs, reserve capacity for hottest weather, adjustable control of operation, automatic safeguards on electrical equipment, adequate ice-cube capacity, general durability of cabinet, durability of mechanism, short and infrequent operation, noiselessness.

Mr. Roe told of some of the difficulties which users now face in deciding what refrigerators to purchase. He said:

There are in the United States today about 40 manufacturers of electric refrigerators. Most of them make a variety of sizes and styles in various finishes and for prices extending over a considerable range. We find them lined with enameled steel or glass; outer surfaces of painted wood or enameled steel; mechanical units located in the bottom or at the top, open or sealed in, or even placed down in the cellar. They have little radio dials for adjusting something or other, lights inside, and defrosting switches. They have a variety of shelf arrangements, some with milk compartments on the bottom and some at the top. How is anyone to know which one to buy or which to promote? They have different kinds of motors, with various degrees of noiselessness. Some start more frequently and some run for longer periods than others. Some have little automatic safeguards for the electrical features and some do not. How can one make an intelligent choice? It is reasonable to expect that with so many designers and manufacturers of electric refrigerators there would be differences in the amount of electricity consumed. Anyone can compare the original purchase prices, but who can say which refrigerator operates with the least cost for electricity? To many customers of the central stations the operating cost is of great importance and may influence a sale materially. True, much depends upon the local rate, but even knowing the rates, the information as to operating cost is of such importance and is relatively so easily obtainable, that it would seem to me to be practicable to inform the domestic purchaser quite accurately thereon. There must be differences in durability of the mechanism too, but if information on that point is extant it is not generally available.

Now it might be argued that all electric refrigerators are worthy, and the household purchaser can choose the one that fits her pocketbook and matches her kitchen color scheme and be sure of getting her money's worth. My reply is that such might be the case, but there is nothing to prove that it is so. Moreover, it is not likely that 40 manufacturers will all build equally well. The fact remains that each purchaser wants the greatest value for his money and the best guide he has is that the So-and-So have an Antarctic and think it is all right, so perhaps he should buy an Antarctic also.

But there is a growing reserve of information on certain aspects of this subject. For several years past many of the larger central station companies, members of the National Electric Light Association, have been testing electric refrigerators in accordance with the procedure established by the Committee on Electric Refrigeration in 1924–25. Upon the basis of these tests these power companies have information as to the relative energy consumption of various makes of refrigerators, the temperatures attained inside, and something as to the capacity of the machines when operating at high summer temperatures. I earnestly recommend to you who are associated with these power companies that you become familiar with the test data derived from the work of these laboratories in your own companies, that you study the diagrams which your own laboratory engineers have produced, and that you learn to differentiate between the different kinds of electric refrigerators upon the basis of their laboratory performance. To those of you who are associated with manufacturers, let me say that your engineers and designers must have information regarding the performance of your own make of refrigerator. If you have this information in definite terms you are better equipped to discuss intelligently the merits of that particular

brand of equipment in which you are chiefly interested. The domestic purchaser has a right to this information. He doesn't often know how to ask for it except in the one case—every purchaser wants to know in advance how much it costs to operate an electric refrigerator. At the present time the usual practice is to dodge this question by some such remark as "Oh, it costs only a few cents a day."

Color Specifications Council Recommended at Conference

Delegates present at the special color conference held under the auspices of the Optical Society of America and the American Physical Society on February 26 at the Museum of Science and Industry, New York, unanimously voted to recommend the formation of an Inter-Society Council on Color Specifications.

This meeting was held as the result of the action of the Executive Council of the Optical Society of America, which recommended the formation of an inter-society council in the following resolution adopted in October, 1930:

> "It is the sense of the Executive Council of the Optical Society of America that the need for better organization of those interested in the description and specification of color which found expression at the 'Color Conference' held in Washington, May 14, 1930 (at which conference the Optical Society was officially represented), can best be met by the formation of a joint council consisting of officially designated representatives of the several national societies and associations interested in the description and specification of color.
>
> "It was further decided that the President should write a letter to Professor Gathercoal (U. S. Pharmacopoeia) explaining the attitude of the Optical Society and calling attention to the colorimetry program to be held in New York on February 26, 1931, as offering a favorable opportunity for a further conference on the subject."

The action of the conference on February 26 is contained in the several resolutions recommending the appointment of delegates to represent the national societies on the proposed Inter-Society Color Conference. The resolutions stipulate that an Inter-Society Color Council be formed composed of delegates from national societies and associations interested in the standardization, description, and specification of color; that the organizations represented in the conference appoint official delegates after which the first meeting of the Council will be held and a permanent organization formed; that all of the organizations invited to be represented at the conference, but which did not send delegates, be invited to send delegates to the first meeting of the Council; that the organizations shall have as many delegates to the Council as they wish, each organization having, however, only one vote.

The following organizations were represented at the preliminary conference:

American Association of Textile Chemists and Colorists

American Chemical Society

American Institute of Architects

American Oil Chemists' Society

American Physical Society

American Psychological Association

American Society for Testing Materials

American Standards Association

Illuminating Engineering Society

Museum of Science and Industry, N. Y.

Optical Society of America

Society of Motion Picture Engineers

Technical Association of the Pulp and Paper Industry

Textile Color Card Association of the U. S., Inc.

California and Massachusetts Representatives Appointed

Edward O. Otis, Jr., of Boston, Merchandising Adviser of the Associated Industries of Massachusetts, and C. W. Whitney of San Francisco, Executive Secretary of the Purchasing Agents' Association of Northern California, have been appointed Massachusetts and California representatives, respectively, of the American Standards Association. Mr. Otis and Mr. Whitney will serve as contact points between the industries of Massachusetts and California and the American Standards Association. A file of the 185 national standards approved by the American Standards Association is maintained by each of the local representatives for reference by local engineers and industries.

Other local representatives of the American Standards Association are:

E. D. Strickland, Executive Secretary, Engineering Society of Buffalo, Buffalo, N. Y.

Edgar S. Nethercut, Secretary, Western Society of Engineers, Chicago, Illinois

C. R. Sabin, Manager, Cleveland Engineering Society, Cleveland, Ohio

Bernard Moll, Secretary, Grand Rapids Engineers Club, Grand Rapids, Michigan

Charles E. Billin, Secretary, Engineers Club of Philadelphia, Philadelphia, Pa.

K. F. Treschow, Secretary, Engineers Society of Western Pennsylvania, Pittsburgh, Pa.

O. L. Angevine, Executive Secretary, Rochester Engineering Society, Rochester, N. Y.

George S. Wilson, Engineering Experiment Station, University of Washington, Seattle, Wash.

Bureau of Standards Issues 1931 Yearbook

The 1931 edition of the *Standards Yearbook* has been published by the United States Bureau of Standards (Misc. pub. 119). This book includes summaries of the activities of the various governmental standardizing laboratories abroad, particularly in England, Germany, and France. It reviews the current standardization programs of trade associations and technical societies in this country interested in the establishment of standards and shows methods employed in making these standards and specifications effective.

The special feature of the 1931 edition is a 33-page symposium on standardization in transport. A series of articles by leaders in the field of transportation in this country include such subjects as aviation, automotive industry, highways, railroads, pipe lines, elevators, marine navigation, speech, and power transmission.

The Library of Congress has prepared a 14-page bibliography on standardization which is in the nature of a supplement to the bibliographical material included in previous editions of the *Standards Yearbook* since 1928.

One chapter of the book is devoted to the purchasing problems of municipal, county, and state purchasing agencies. The results of a recent survey show that information about purchasing methods has been reported by 567 municipalities, half of these cities using specifications in the purchase of materials, equipment, and supplies. Trained inspectors are maintained for the purpose of checking deliveries to determine whether or not commodities comply with specification requirements in 238 cities. Laboratories equipped for testing certain commodities are maintained by 30 cities. One hundred five cities report centralized purchasing; all of these attribute certain economies to the system.

The work of the American Standards Association is reviewed and a list of the standards approved during the past year is included.

Copies of the 1931 *Standards Yearbook* may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., or through the ASA Information Service. The price is $1 per copy.

Purchasing Is Important Part of Production Machinery

The need for carefully drawn standards and specifications as a basis for the purchase of materials may be realized from a statement by the Department of Manufacture of the U. S. Chamber of Commerce that in some industries material costs constitute as much as 80 per cent of the total cost of the finished product. In a bulletin, "Management Looks to Material Costs," the Department states:

> "In exercising its functions in the locating of sources of supply and in placing orders for material requirements, the purchasing department is an important cog in the machinery of production, and the actions of this department penetrate to almost every point in the structure of production costs. Business can extend to the purchasing function those controls and checks which, through adequate cost accounting methods, it has applied to its production processes. The purchasing department is but one component part of the process of transforming raw materials into finished products, and as such, must coordinate its activities, and account for its results, in harmony with the other parts."

Study Programs for Consumer Problems Suggested

Copies of "Household Purchasing," a pamphlet prepared by the American Home Economics Association and the U. S. Bureau of Home Economics, containing suggestions for group programs on this subject, and "More Intelligent Buying," a study program suggested by the American Home Economics Association reprinted from the February *Woman's Journal* are available through the ASA Information Service. Both papers include in their outlines of study programs the subject of standards and specifications.

Book on Economic Control of Manufacturing Stresses Importance of Standardization

A new book, *Economic Control of Engineering and Manufacturing*, by Frank L. Eidmann, which contains an important chapter on standardization and simplification, has just been published by the McGraw-Hill Book Company (price, $4.00).

The purpose of this book, as explained in the introduction, is

> "to direct the attention of the reader to some of the problems of engineering and manufacturing whose solution depends upon economic analysis and to present some method of procedure."

Problems discussed from the economic point of view include: industrial management; plant location; engineering materials; operation, maintenance, and replacement of equipment; handling of materials; research; packing and shipping; personnel and wages.

One chapter of the book, entitled "Economic Aspects of Standardization and Simplification," devoted to a consideration of standards and specifications in relation to other problems of economic control, states that:

> "Industrial standardization consists[1] of singling out specific products and materials; settling upon their performance, properties, and dimensions; and fixing attention upon them both in production and in use to the end that the greatest possible industrial efficiency may be attained. It includes:
> "1. Nomenclature and definitions of technical terms used in specifications and contracts; also technical abbreviations and symbols.
> "2. Uniformity in dimensions necessary to secure interchangeability of parts and supplies, and makes possible the interworking of apparatus. Dimensional standards.
> "3. Quality specifications for materials and equipment; composition, form, and structure.
> "4. Methods of testing to determine standards of quality and performance.
> "5. Ratings of machinery and apparatus under specific conditions.
> "6. Safety provisions and rules for the operation of apparatus and machinery in industrial establishments. Safety codes and standards of practice.
> "7. Simplification by the elimination of unnecessary variety in types, sizes, and grades, this selection being usually based upon the relative commercial demand.
> "Standardization is absolutely essential in any program of mass production. When properly applied, it is one of the major factors in the elimination of waste in industry."

The benefits of standardization are summarized as follows:

> "It makes the best available for all.
>
> "It reduces cost,...uniformity in output contributes to economies in production.
>
> "It reduces cost of carrying stocks of materials and the cost of maintenance of repairs....
>
> "It reduces the cost of instruction of new employees....
>
> "It reduces accounting costs....
>
> "It renders enormous supplies of materials and labor available in emergencies.
>
> "It greatly facilitates development work. Standardization provides a definite point of departure from which to start an improvement.
>
> "It minimizes complicated engineering and operating problems."

A very large proportion of the chapter is devoted to a discussion of size standardization by a system of preferred numbers, a fundamental consideration in any industrial standardization program. The material is presented with interesting illustrations, and practical applications of preferred numbers in manufacturing processes are cited.

Standards are also mentioned in connection with designing and drafting. The author says in part on this subject:

> "It is so much easier to make a new drawing than to hunt through the files to see if a similar part from another machine may serve the purpose; but the cost is much greater in the long run.... By using screws and bolts of sizes already in use, not so many sizes of bar stock have to be kept on hand. From the viewpoint of the production department, all efforts to standardize will lead to the manufacture of parts in larger and, therefore,

[1] *Mechanical Engineering*, Vol. 45, No. 2.

more economical quantities. Another step in standardization of design is the use of standard units which may be suitable for several sizes or types of machines. For instance, the same governor unit may serve on a number of different engines; the same differential may be employed on several different motor cars; or the same electrical starter or ignition unit may be suitable for many different engines. The reduction in the amount of capital tied up in inventory and the reduction in manufacturing costs due to standardized design have been surprisingly high in the plants of many firms which have reported results."

Specification Writing Discussed

Form and arrangement of specifications is discussed, and also specification writing. The writer says:

"Attention has been called to three points of view from which specifications might be considered—the legal, the technical, and the grammatical.... All clauses should be definite and exact in details as opposed to being vague and indefinite. Completeness refers to the need that the specifications include all necessary information. Logical arrangement of the details is an important factor in clearness."

The importance of performance requirements is illustrated with the case of electrical insulating materials. The previous plan of specifying different rubbers, oils, waxes, and fillers in grades and percentages was found to produce an unsatisfactory product in some cases and now manufacturers specify insulating resistance, dielectric strength, and specific inductive capacity, with much more satisfactory results.

ASA Will Exhibit at Foundrymen's Convention

The American Standards Association will have an exhibit in the non-commercial section of the American Foundrymen's Association Convention and Exhibit at the Stevens Hotel in Chicago, May 4 to 7, inclusive.

With reference to future conventions and exhibits in which ASA may participate, the ASA office will be glad to enter into communication with Sustaining-Members regarding exhibits of products which are being made in accordance with American Standards and which they might wish to supply for use in exhibits on future occasions.

Classification of Sources of ASA Income

A classification of the income of the American Standards Association, made with respect to the sources from which it is derived, is given below. At the present time, the income is at the rate of approximately $140,000 per year.

This classification is necessarily a rough one and is made from the point of view of the principal interest in ASA of the organizations concerned. For the purposes of the classification, operators are considered as those managing properties, such as railways, public utilities, oil companies, etc., and ultimate consumers as those who purchase the final product or service of manufacturers or operators for consumption. General interests consist chiefly of professional societies and insurance groups.

Income from Member-Body Dues

Manufacturers	24 per cent
Operators	30
Ultimate Consumers	4
General Interests	42
	100

Income from Sustaining-Memberships

Manufacturers	57 per cent
Operators	36
Ultimate Consumers	1
General Interests	6
	100

Income from Underwriters

Manufacturers	47 per cent
Operators	47
General Interests	6
	100

Total Income

Manufacturers	45 per cent
Operators	43
Ultimate Consumers	1
General Interests	11
	100

Papers on Colorimetry Available

The American Standards Association has recently received a bibliography of the papers on all phases of colorimetry which have emanated from the Bureau of Standards. The period covered is from August, 1926, to June, 1929. Copies of the bibliography are available for loan.

An Index to Issues 50-56 of the ASA Bulletin for June through December, 1930

In order that the information contained in the ASA BULLETIN may be more readily accessible to those interested in keeping a complete file, an index to issues published during 1930 has been compiled. An annual index will be published hereafter.

Sustaining-Members wishing to complete their files of the ASA BULLETIN may write the ASA office for missing numbers. Copies of back issues which are still available will be furnished without charge until the supply is exhausted.

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ASA PROJECTS

Transportation, Ferrous Metallurgy, and Non-Ferrous Metallurgy Projects

The sixth of a series of reviews of standardization projects under the procedure of the American Standards Association

The status of all projects concerning transportation and ferrous and non-ferrous metallurgy developed or in course of development under ASA procedure is summarized in the following review. The data presented are taken from the files of the American Standards Association and are corrected to April 1, 1931. The personnels of the sectional committees handling the projects may be found by reference to the project sections (E, G, and H) of the 1931 American Standards Yearbook (pages 58–63).

E2—Design for Joint Plates for Seven-Inch Girder-Grooved and Guard Rails

Scope—Design for bolted joint plates to be used with the standard seven-inch girder-grooved and girder-guard rails, for electric railway track construction.
(*Refer to Project E7*)

E3—Design for Joint Plates for Nine-Inch Girder-Grooved and Guard Rails

Scope—Design for bolted joint plates to be used with the standard nine-inch girder-grooved and girder-guard rails, for electric railway track construction.
(*Refer to Project E7*)

E4—Design for Seven-Inch Girder-Grooved Rail

Scope—Design, covering weight and dimensions, for a medium weight seven-inch girder-grooved rail, for electric railway track construction.
(*Refer to Project E7*)

E5—Design for Nine-Inch Girder-Grooved Rail

Scope—Design, covering weight and dimensions, for a medium weight nine-inch girder-grooved rail, for electric railway track construction.
(*Refer to Project E7*)

E6—Design for Seven-Inch Girder-Guard Rail

Scope—Design, covering weight and demensions, for the girder-guard rail to be used on curves in conjunction with the standard seven-inch girder-grooved rail, for electric railway track construction.
(*Refer to Project E7*)

E7—Design for Nine-Inch Girder-Guard Rail

Scope—Design, covering weight and dimensions, for the girder-guard rail to be used on curves in conjunction with the standard nine-inch girder-grooved rails, for electric railway track construction.

The above standards were submitted as existing standards by the American Electric Railway Association (A.E.R.A.) and approved as American Standards by ASA in 1923, the A.E.R.A. being appointed sole sponsor. The standards E4, E5, E6, and E7 are now under revision. In so far as E4 and E5 are concerned, the revision consists solely in the addition of a note regarding the laying of the track and a standard designation for the rail type in question, but does not affect the dimensional specifications of the rail. The standards E6 and E7, however, will be changed with regard to certain dimensions so that the original standards will become obsolete.

E8—Design for Seven-Inch, 82-Lb Plain Girder Rail and Splice Bar for Use in Paved Streets

Scope—Design, covering weight and dimensions, for a seven-inch, eighty-two pound plain girder rail to be used under medium traffic conditions, in conjunction with deep block pavement, for electric railway track construction; and including design of joint plates suitable for use with such rails.

Chairman—R. C. Cram, Third Avenue Railway Company, New York, N. Y.

Secretary—Howard H. George, Cleveland Railway Company, Cleveland, Ohio.
(*Refer to Project E11*)

E9—Design for Seven-Inch, 92-Lb Plain Girder Rail and Splice Bars for Use in Paved Streets

Scope—Design, covering weight and dimensions, for a seven-inch, ninety-two pound plain girder rail to be

used under heavy traffic conditions, in conjunction with deep block pavement, for electric railway track construction; and including design of joint plates suitable for use with such rails.

Chairman—R. C. Cram, Third Avenue Railway Company, New York, N. Y.

Secretary—Howard H. George, Cleveland Railway Company, Cleveland, Ohio.

(*Refer to Project E11*)

E10-1929—Specifications for Materials for Use in the Manufacture of Special Track Work

Scope—These specifications are intended to cover the manufacture, chemical and physical properties, and tests of materials entering into the manufacture and assembly of special trackwork for steam, electric, and industrial tracks of all gages and types, for heavy rail of 50 lb per yard and over, under any motive power, and in either open or paved track.

Chairman—R. C. Cram, Third Avenue Railway Company, New York, N. Y.

Secretary—Howard H. George, Cleveland Railway Company, Cleveland, Ohio.

(*Refer to Project E11*)

E11—Design for Seven-Inch, 102-Lb Plain Girder Rail and Splice Bars for Use in Paved Streets

Scope—Design, covering weight and dimensions, for a seven-inch, one hundred and two pound plain girder rail to be used under heavy traffic conditions, in conjunction with deep block pavement, for electric railway track construction; and including design of joint plates suitable for use with such rails.

Chairman—R. C. Cram, Third Avenue Railway Company, New York, N. Y.

Secretary—Howard H. George, Cleveland Railway Company, Cleveland, Ohio.

The above standards E8 to E11, inclusive, were developed by a sectional committee organized in 1923 by the American Electric Railway Association, sole sponsor for these projects. The standards E8, E9, and E11 were approved by ASA in 1926, and E10 in 1929, all four being approved as American Tentative Standards.

At the present time the standards E8, E9, and E11 are subject to a revision which, however, does not affect their dimensional specifications.

G8—Zinc Coating of Iron and Steel, Specifications for

Scope—Development of nationally uniform specifications for the adequate protective coating of different classes of zinc-coated products, including: outside electrical construction; inside electrical construction, including conduits; sheets and plates and products fabricated therefrom, for outside use; sheets and plates and products fabricated therefrom, for inside use; water pipes and associated valves and fittings; agricultural implements, tools, and small general hardware; marine hardware and ship fittings; rivets, bolts, nuts, screws, and nails; structural shapes; fencing material and woven wire cloth; and including all forms of zinc coating for iron and steel—hot galvanizing, sherardizing, electroplating, spray coating—and methods for the testing of all such coatings.

Chairman—J. A. Capp, Chief of Testing Laboratory, General Electric Company, Schenectady, N. Y.

Secretary—A. B. Campbell, National Electric Light Association, New York, N. Y.

In June, 1922, a general specification for galvanizing or sherardizing of iron and steel was submitted, together with ten other specifications and standards developed and approved by the American Electric Railway Association, for approval as American Tentative Standards. The special committee appointed by ASA to investigate the acceptability of these specifications to industry observed a strong interest in the subject in a number of quarters and was advised that no single specification would be satisfactory for application to all zinc-coated products. A conference was held of representatives of all groups concerned and upon consideration of their recommendations the ASA Standards Council, at its meeting on January 29, 1924, decided that the work should be undertaken by a sectional committee under the sponsorship of the A.S.T.M. This recommendation was approved by the ASA Standards Council and in October, 1925, a sectional committee composed of 47 members representing 34 organizations was organized to initiate the development of the various specifications within its scope. It was found that this activity could be arranged in the following several classes of coatings: hardware and fastenings; sheet and sheet products; structural steel shapes, plates and bars and their products; pipes, conduits, and their fittings; wire and wire products; and methods of testing. Subcommittees were appointed to develop specifications on these subjects. Three of these have prepared proposals which are now before the members of the sectional committee, or before the sponsor for approval. The committees on hardware and fastenings and methods of testing are still making investigations preparatory to the formulation of their proposals on these subjects. The Committee on Zinc Coating of Structural Steel Shapes, Plates and Bars and Their Products was the first to complete its specifications. These, after approval by the sectional committee and sponsor organization, have been approved by ASA as an American Tentative Standard.

The committee on zinc-coated (galvanized) sheets has recently completed proposed specifications for such sheets. These have been approved by the sponsor and submitted to ASA for approval as an American Tentative Standard. The question of this approval is now under consideration.

G9—Specifications for Carbon-Steel and Alloy-Steel Blooms, Billets and Slabs for Forgings

Scope—Specifications for general commercial purposes covering blooms, billets, and slabs of carbon and alloy steel destined for forgings and to be purchased as semi-finished rolled or forged material, covering carbon and alloy steels (nickel, chrome-nickel, chrome and chrome-vanadium steel), their classification and grades, manufacture, chemical properties and tests, workmanship and finish, marking and rules governing inspection and rejection.

This standard was submitted by the American Society for Testing Materials (A.S.T.M.) as an existing standard and approved by ASA as an American Tentative Standard in 1924. A revision of the standard was submitted by the A.S.T.M. in 1929 for approval as a proprietary standard. Action on this case is awaiting the completion of an exhibit required, according to ASA procedure, in support of the submission.

G12-1931—Specifications for Refined Wrought-Iron Bars

(*Refer to G13-1931*)

G13-1931—Specifications for Wrought-Iron Plates

These two specifications were submitted by the American Society for Testing Materials as existing standards and approved by ASA as American Tentative Standards in 1923.

In 1930 both specifications were revised by the A.S.T.M., the revision consisting in the incorporation of a definition for wrought iron, and the elimination of reference to puddling. The revised specifications were submitted by the A.S.T.M. as proprietary standards and approved by ASA as American Tentative Standards in 1931, the A.S.T.M. being appointed proprietary sponsor.

H1—Zinc and Zinc Ores

Scope—The definition of grades of spelter; gages and tolerances for sheet zinc; physical tests for sheet zinc; methods of chemical analysis of zinc and zinc ores, and methods of sampling and weighing.

Chairman—W. H. Bassett, Technical Superintendent, American Brass Company, Waterbury, Conn.

Secretary—G. C. Stone, Chief Metallurgist, New Jersey Zinc Company, New York, N. Y.

In 1920, ASA received a communication from the national standardizing body in Belgium suggesting international standardization of different matters pertaining to zinc. ASA requested the American Zinc Institute and the American Society for Testing Materials to act as joint sponsors for the work proposed. Both organizations accepted the invitation and organized a sectional committee to deal with the subject. Although exchange of information has taken place, through ASA, between the sectional committee and foreign national standardizing bodies, no progress of any importance toward international standardization has so far been made. In fact, it has appeared that certain requirements, for example, those regarding the grading of commercial zinc, are much more rigorous in this country than abroad. Thus, a comparison between a Belgian proposal for a standard on zinc and the A.S.T.M. Specifications B6-1918 for Slab Zinc (Spelter) showed that the lowest total amount of impurities permissible according to Belgian practice was 1.0 per cent, whereas the lowest total amount for the best American grade is only 0.1 per cent.

Consequently, while exchange of information with foreign bodies is still going on, the work so far has developed in a national rather than an international character. At its latest meeting the sectional committee voted to recommend that the American Standards Association approve the A.S.T.M. Standard Specifications for Slab Zinc (Spelter) (B6-18) and the A.S.T.M. Standard Methods of Chemical Analysis of Slab Zinc (Spelter) (B38-21) as American Standards. It also voted to recommend that the A.S.T.M. Standard Specifications for Rolled Zinc (B69-29) be approved by the American Standards Association as an American Tentative Standard. Furthermore, the sectional committee expressed the opinion that it would be of considerable assistance to industry if standard samples for zinc and for zinc ores would be made available by the U. S. Bureau of Standards, and voted to recommend the preparation of such samples.

The Belgian national standardizing body has made the suggestion that the standardization of commercial zinc be taken up under the auspices of the International Standards Association (ISA), established in 1929. This matter was brought to the attention of the sectional committee by ASA and the committee decided that, should an international committee be organized under ISA auspices, it would be prepared to cooperate through the appointment of a corresponding member.

H4-1928—Specifications for Soft or Annealed Copper Wire

Chairman—J. A. Capp, Chief of Testing Laboratory, General Electric Company, Schenectady, N. Y.

This standard was submitted by the American Society for Testing Materials (A.S.T.M.) as an existing standard and approved by ASA as an American Tentative Standard in 1921. The A.S.T.M. was appointed sole sponsor and organized a sectional committee under ASA procedure to take care of future revisions of the

standard. This committee also dealt later on with revisions of existing American standards, and the submission of further standards on copper wire to ASA, dealt with elsewhere in the present review.

In 1925 the A.S.T.M. revised the specifications H4, the revision consisting in the substitution of the "density" of copper for "specific gravity" as the basis of weight calculation, and a rearrangement in form. The revised specifications were submitted to ASA by the A.S.T.M. and by the ten joint sponsors for the project C8 on Insulated Wires and Cables, the sectional committee on the latter subject having found the specifications suitable for its purpose. The specifications H4 were approved by ASA in 1928 as an American Standard. In connection with the work of sectional committee C8 they are also designated by the symbol C8b2-1928.

H7-1925—Specifications for Brass Forging Rod

Scope—Specifications for brass forging rods capable of being readily forged hot and easily machined; their manufacture, chemical properties and tests, physical properties and tests, permissible variations in dimensions, workmanship and finish, and rules governing inspection and rejection.

This standard was submitted by the A.S.T.M. as an existing standard and approved by ASA as an American Tentative Standard in 1925.

H8—Specifications for Free-Cutting Brass Rod for Use in Screw Machines

Scope—Specifications for free-cutting brass rods suitable for high-speed screw machine work; their manufacture, chemical properties and tests, physical properties and tests, permissible variations in dimensions, workmanship and finish, and rules governing inspection and rejection.

The standard was submitted by the American Society for Testing Materials as an existing standard and approved by ASA in 1925 as an American Tentative Standard, the A.S.T.M. being appointed sole sponsor. In 1929 the A.S.T.M. submitted a revision of the standard for approval as a proprietary standard. ASA has deferred action pending the submission of further information by the A.S.T.M. regarding the development of the specifications.

H11-1924—Specifications for Solder Metal

Scope—Specifications for lead-tin alloys used for solder metal, commercially known as soft solder, in various classes and grades; their manufacture, chemical properties and tests, commercial sizes or shapes, marking and rules governing inspection and rejection.

This specification was submitted by the American Society for Testing Materials as an existing standard and approved by ASA in 1924 as an American Tentative Standard, the A.S.T.M. being appointed sole sponsor.

H13-1925—Outside Dimensions of Plumbago Crucibles for Non-Tilting Furnaces in Non-Ferrous Foundry Practice

Scope—Standardization of size numbers and dimensions of plumbago crucibles for use in casting brass and other non-ferrous metals in connection with non-tilting furnaces.

The Plumbago Crucible Association submitted this standard as an existing standard. It was approved by ASA in 1925 as an American Tentative Standard, the Plumbago Crucible Association and the American Foundrymen's Association being appointed joint sponsors.

H14-1929—Specifications for Hard-Drawn Copper Wire

Scope—These specifications cover copper wire suitable for use as electrical conductors and for mechanical purposes but exclude copper trolley wire.

Chairman—J. A. Capp, Chief of Testing Laboratory, General Electric Company, Schenectady, N. Y.

This standard was submitted by the American Society for Testing Materials as an existing standard in 1924 and referred back to that body by ASA to be revised by a sectional committee to be organized by the A.S.T.M. as sole sponsor. This action was taken on account of objections raised by the power companies to the standard in the form as submitted. After revision by the sectional committee, the specifications were resubmitted by the A.S.T.M. and approved by ASA as an American Standard in 1929.

H15—Specifications for Medium Hard-Drawn Copper Wire

Scope—These specifications cover medium hard-drawn copper wire suitable for electrical conductors and for mechanical uses.

Chairman—J. A. Capp, Chief of Testing Laboratory, General Electric Company, Schenectady, N. Y.

This standard was submitted in 1924 by the American Society for Testing Materials (A.S.T.M.) as an existing standard and referred back to that body by ASA for sectional committee procedure in order to make it fully acceptable to the Light and Power Group. The specifications have not yet been re-submitted to ASA.

H16-1928—Specifications for Tinned Soft or Annealed Copper Wire for Rubber Insulation

Scope—These specifications cover tinned soft or annealed copper wire suitable for use in making rubber insulated wires and cables.

Chairman—J. A. Capp, Chief of Testing Laboratory, General Electric Company, Schenectady, N. Y.

This standard was submitted by the American Society for Testing Materials as an existing standard in 1924 and referred back to that body by ASA pending action upon the specifications by sectional committee C8 on insulated wires and cables and also in connection with a question raised regarding the assignment of sponsorship. The standard was re-submitted by the A.S.T.M. as sole sponsor and by the ten joint sponsors for project C8. It was approved by ASA as an American Standard in 1928, the A.S.T.M. being appointed sole sponsor. In connection with the work of sectional committee C8, the specifications also are designated by the symbol C8b1-1928.

H17—Specifications for Lake Copper Wire Bars, Cakes, Slabs, Billets, Ingots, and Ingot Bars

H18—Specifications for Electrolytic Copper Wire Bars, Cakes, Slabs, Billets, Ingots, and Ingot Bars

H19—Specifications for Sheet High Brass

H20—Specifications for Manganese Bronze Sand Casting

H21—Specifications for Manganese Bronze Ingots for Sand Castings

The above five specifications have been submitted by the American Society for Testing Materials for approval by ASA under the rules governing the approval of proprietary standards, the A.S.T.M. to be the proprietary sponsor. Specifications H17, H18, and H19 were originally submitted to ASA as existing standards and approved as such, H17 and H18 in 1921, and H19 in 1924. On account of revisions made in the specifications, their approval by ASA became automatically cancelled in 1927.

Committee Is Making Survey of Screw Thread Practice

A survey of approximately 125 manufacturing plants to determine present practice with regard to screw threads is being made by the sectional committee on Screw Threads for Bolts, Machine Screws, Nuts and Commercially Tapped Holes (B1a-1924).

This survey is intended to provide information for a revision of the present standard, if necessary, so that it will better serve the needs of the manufacturers and users of screw threads. The investigation is intended to show:

The actual state of screw thread standardization in the United States at the present time

The range of accuracy desirable for an acceptable product of a given class

The range of accuracy commercially attainable

In 1924 ASA approved the American Standard on this subject which was developed by a sectional committee sponsored by the American Society of Mechanical Engineers and the Society of Automotive Engineers on the basis of a report made by the National Screw Thread Commission in 1921.

In 1929 the sectional committee was reorganized in order to review the American Standard with the purpose of determining whether it required revision, or supplementing, with a view to developments since 1924 when the standard was approved. It was decided that this review would comprise a survey on current screw thread practice in this country.

A field worker, Mr. S. H. Lott, Associate Professor, Department of Machine Design, Stevens Institute of Technology, Hoboken, New Jersey, has now been selected by the sectional committee and will visit approximately 125 manufacturing plants located in the area east of the Mississippi and north of the Ohio and Potomac. These firms have been selected as being representative manufacturers and consumers of bolts, screws, and nuts. Mr. Lott will call at each of these plants and select from the stock bins samples of screws, bolts, nuts, and certain small threaded parts made to the American Standard or other screw thread standards.

For the purpose of this survey these parts may be either purchased or made on the premises. They are to be tagged by Mr. Lott and sent direct to the U. S. Bureau of Standards at Washington, D. C., where they will be measured for all the elements of a screw thread fit. The results of these tests will be published but in

such a way that no one except the officials at the Bureau and the individual manufacturer will be able to identify the samples.

Sponsor Restricts Scope of Work on Valves

In the September, 1930, issue of the ASA BULLETIN, pages 29–30, mention was made of the fact that the Manufacturers Standardization Society of the Valve and Fittings Industry (M.S.S.) had declared that it was not in favor of further work being done on two subjects taken up by subcommittee 5, of the sectional committee on Pipe Flanges and Fittings (B16), dealing with face to face dimensions of ferrous flanged valves. These two subjects are "Center to Face Dimensions of Check Valves in Iron and/or Steel for Pressures Less Than 400 Lb Steam," and "Center to Face Dimensions of 150 Lb Steel Flanged Globe and Angle Valves."

Since this decision was announced in September, the Manufacturers Standardization Society has requested that the subcommittee should not consider the development of center to face dimensions of steel flanged globe and angle valves in sizes 8 in. and larger for 300 lb (250 lb) pressure, and has recommended that the subject "Center to Face Dimensions of 125 and 250 Lb Cast Iron Flanged End Double Disc Gate Valves" be deleted from the scope of the subcommittee.

The scope of the work originally assigned to the subcommittee in question is as follows:

> The standardization of face to face dimensions of ferrous gate, globe, angle, and check valves having flanged connecting ends with W.S.P. ratings of 125 and 250 lb per sq in.

This scope was formally accepted by the sectional committee and its three sponsor bodies, viz., the Manufacturers Standardization Society of the Valve and Fittings Industry, the American Society of Mechanical Engineers, and the National Heating and Piping Contractors Association.

Dean Collins P. Bliss, chairman of the sectional committee, in a letter to that body, has brought to its attention the fact that a comparison of the several recommendations made by the M.S.S. with the original scope of the subcommittee's work seems to indicate that all that is now left of the original scope is the standardization of steel flanged globe and angle valves with a 300 lb (250 lb) rating in sizes from 0 to 6 inches, inclusive. The chairman has asked the members of the sectional committee to express their views on this situation.

Revision of Fire-Hose Specifications Approved

The American Standards Association has approved a revision of the specifications for Cotton Rubber-Lined Fire Hose (L3-1929), which increases the permissible organic acetone extract from 3 per cent to 4 per cent of the rubber compound by weight.

Developments in modern rubber manufacture have brought about the use of various antioxidants and accelerators in rubber compounding for the purpose of insuring longer life and better wearing qualities in finished rubber products. The use of these compounding agents has the effect of increasing the organic acetone extract and the revision which has been approved makes the specifications keep pace with the modernization of rubber manufacture.

These specifications and the new revision were developed under the sponsorship of the American Society for Testing Materials and the Fire Protection Group, composed of the Associated Factory Mutual Fire Insurance Companies, National Board of Fire Underwriters, National Fire Protection Association, and the Underwriters' Laboratories.

Scope of Line Insulators Committee Approved

The Standards Council at its meeting of March 12 approved the following scope for the work on standardization of insulators for electric power lines (C29):

> Specifications, including rating, dimensions for interchangeability and tests, for line insulators of all types except those used for communication lines.

The sponsors for this work, the American Institute of Electrical Engineers and the National Electrical Manufacturers Association, have practically completed their plans for the organization of the sectional committee, and it is expected that the actual work will be undertaken in the near future.

Code for Coal Pneumatic Cleaning Plants Published

The Safety Code for Coal Pneumatic Cleaning Plants (Z12f-1931), approval of which was announced on page 29 of the January issue of the ASA BULLETIN, has been published and is available at ten cents per copy from ASA.

The Basic Principles Underlying ASA Work Outlined by Committee on Procedure

The relationship of the Board of Directors and the Standards Council of the American Standards Association to projects under ASA procedure is clarified in "A Statement of the Basic Principles Underlying ASA Work" prepared by the ASA Committee on Procedure under the chairmanship of John C. Parker and approved by both the Board and the Council.

The statement emphasizes the judicial character of the ASA governing bodies and of all actions which they take in relation to standardization projects, from the request for the initiation of a project to the approval of the standard. The statement also analyzes the nature of the responsibility of Cooperating-Bodies and their representatives on sectional committees. The statement follows:

The American Standards Association does not attempt to make decisions of industrial policy through its own administrative agencies (Board of Directors, Standards Council, etc.). It provides the machinery (sectional committees, conferences, etc.) through which the industries themselves arrive at such decisions. In every case the facts regarding such decisions, and the procedure followed in reaching them, is made clearly available to all concerned.

It follows as a corollary that the ASA takes up new projects only upon request, and only when such a request has sufficient industrial support to warrant the undertaking of the project, the facts, again, being available to all concerned.

The converse corollary follows in precisely the same way, viz., that the ASA itself does on a basis of engineering or economic considerations, not make specific negative decisions, for example, either against initiating a project, or for stopping a project already started. In such cases the responsibility before the public lies with the group or groups, through whose actions such decisions are reached.

The functions of the Board and the Standards Council in all such matters are distinctly judicial ones. These functions have to be so scrupulously guarded and the record made so clear and precise that there can be no grounds for suspicion that the judicial processes of the ASA are being diverted to selfish ends by any group, or that they are being used as a screen by any party to a controversy. In fact, much of ASA procedure is so clearly of a judicial nature that it has to be carried out with all of the scrupulous care which is exercised in the best of our courts. It is important that the various groups and individuals having to do with the work of the Standards Council and of the Board clearly understand this fact.

Ample machinery in the form of sectional committees, conferences, special committees, etc., is provided for the reconciliation of divergent views on technical matters, and for the resolution of technical controversies when they arise. Cooperating bodies and their representatives are under obligation to use this machinery for such questions, instead of attempting in any manner to introduce them into the judicial processes of the ASA.

Furthermore, the functions of the ASA are limited to matters having to do with standardization. Hence, it may not be used in efforts to adjust extraneous questions arising between organizations. For example, the Procedure provides that matters of representation are to be determined simply upon the principle that "groups having a substantial interest" in a standard "have an inherent right to representation on the body dealing with the subject matter of the standard."

These principles require thorough-going responsibility on the part of cooperating bodies and their representatives—responsibility in three senses, viz.:

(*a*) Responsibility in representation. (Unfortunately many men do not fully understand the meaning of representation, or of the responsibilities which it entails.) It is the duty of a representative: (1) to keep sufficiently in touch with his organization, so that he can correctly interpret its attitude in the development of the work and can participate in decisions in committees; (2) to keep his organization informed of developments; (3) to act as a leader in the formulation of the policies of his organization in regard to the matters with which he is dealing; and (4) to refer back to his organization questions upon which he feels unauthorized to speak for it.

(*b*) Responsibility in the sense of carrying out with administrative orderliness, competence, and with reasonable promptness, work for which responsibility has been assumed.

(*c*) Responsibility before the world for the consequences of the acts of its author-

ized committees and representatives, scrupulous care being taken that no effort shall be made to shift this responsibility to the ASA.

ASA Approves Electric Welding Apparatus Committee

The scope and personnel of the sectional committee to develop standards for electric arc welding apparatus (C31) and electric resistance welding apparatus (C32) were approved at the March 12 meeting of the Standards Council. The scope of the committee's work will be as follows:

> The formulation of standards for electric welding apparatus, including definitions of terms, classification, rating, heating, efficiency, testing methods, dielectric test, standard values of current and voltage and name-plate data.

The personnel of the committee consists of the following:

American Bureau of Shipping—J. L. Wilson

American Electric Railway Association—F. McVittie (New York State Railways)

American Institute of Electrical Engineers—A. M. Candy (Westinghouse Electric and Manufacturing Company); J. W. Owens (Welding Engineering & Research Corporation); F. M. Farmer (Electrical Testing Laboratories)

American Institute of Steel Construction—F. H. Frankland

American Railway Association—Lem Adams (Union Pacific Railroad)

American Society of Mechanical Engineers—N. M. Loney (Fisher Body Corporation)

American Welding Society—F. M. Farmer (Electrical Testing Laboratories); Frank P. McKibben (Consulting Engineer); W. Spraragen (American Bureau of Welding) *alternate;* E. Von Steeg (General Electric Company) *alternate*

National Electric Light Association—A. B. Morgan

National Electrical Manufacturers Association—James Burke (Burke Electric Company); L. D. Meeker (General Electric Company); F. W. Ells (Northwestern Manufacturing Company) *alternate;* W. W. Reddie (Westinghouse Electric & Manufacturing Company) *alternate*

Society of Automotive Engineers—Alexander Churchward (Wilson Welder and Metals Company)

U. S. Navy Department—Lt. Com. N. L. Rawlings

Members-at-Large—H. A. Woofter (Swift Electric Welder Company); R. S. Donald (Thomson-Gibb Electric Welding Company)

The organization meeting of the sectional committee was held on November 14, 1930, and it was at this meeting that the scope approved by the Council was recommended. The committee's work is to consist of revisions of the standards of the American Institute of Electrical Engineers on Electrical Arc Welding Apparatus and Electric Resistance Welding Apparatus. In the past, objections to these standards have been raised by the National Electrical Manufacturers Association and the sectional committee requested the Association to clarify the nature of its objections. It is understood that the N.E.M.A. is formulating the exact nature of its objections.

Work on Specifications for Wood Poles Extended

The standardization work on wood poles (O5), which has been going forward under the sponsorship of the Telephone Group (the Bell Telephone System and the U. S. Independent Telephone Association) has been extended to include work on lodgepole and Douglas fir. Specifications and uniform dimension tables for poles of these two species will be developed along the lines established in the work on western red cedar, northern white cedar, chestnut, and southern pine, which is now nearing completion.

Statement of Approval of ASA Projects A44–A45 Corrected

In the "Review of Civil Engineering Projects under ASA Procedure," published in the March, 1931, issue of the ASA BULLETIN, page 30, the two projects, Method of Test for Organic Impurities in Sands for Concrete (A44) and Method of Test for Sieve Analysis of Aggregates for Concrete (A45), are mentioned as having been approved by ASA as American Tentative Standards. These two projects have been submitted by the American Society for Testing Materials for approval as American Standards but have not yet been acted upon by ASA.

Résumé of Progress in the Development of Standard Electrical Definitions

by

H. E. Farrer, *Secretary*
Sectional Committee on Electrical Definitions

The first official step in the plan to develop nationally accepted American Standard definitions in the electrical field was taken in the recommendation of the Standards Committee of the American Institute of Electrical Engineers in April, 1928, suggesting the formation of a sectional committee to undertake such a project which would be completely representative of the electrical field. The Standards Council of the American Standards Association approved the initiation of the work in November of the same year, designating the American Institute of Electrical Engineers as sole sponsor, and outlining the scope of the project as follows:

> Definitions of technical terms used in electrical engineering, including correlation of definitions and terms in existing standards.

The work of organization was immediately undertaken and a careful survey instituted to cover all organizations in electrical and allied fields. Invitations to appoint representatives on the committee were then extended to 46 national engineering, scientific, and professional societies, trade associations, government interests, communication interests, and miscellaneous groups, including the dictionary publishers. Thirty-three of these eventually named representatives. In the meantime, considerable thought was given to drawing up a practical plan of organization and operation, an absolute essential in a project of such vast proportions with many and varied interests involved. The first meeting of the sectional committee was called in December, 1929, with Dr. A. E. Kennelly of Harvard University as chairman.

The next few months were largely devoted to the consideration of organization details. The work of developing and correlating definitions was divided among 14 subcommittees in a classification scheme based largely on that followed in the British Glossary. This scheme was later revised to conform closely to the plan proposed by the Advisory Committee on Nomenclature of the International Electrotechnical Commission, with only such variations as were found necessary to meet the conditions of American practice. A special committee on numbering was also appointed, and after considering several suggested schemes, finally recommended the plan proposed and outlined by the same International Advisory Committee. The work of the sectional committee as a whole has been carried on in an unusually expeditious manner, meetings of the executive committee of the sectional committee being held monthly. The subcommittees have been adding to their personnel from time to time as conditions warranted until at the present time there are close to 100 members of the main committee and the 15 subcommittees, not including completely organized sectional committees in the illumination and radio fields which are also acting as the subcommittees of the sectional committee in those fields. In addition, many subcommittees, in accordance with the plan of operation, are calling upon other groups of experts for aid whenever necessary as, for instance, in the mathematical, chemical, and medical fields.

In an approximation of the eventual size of the undertaking, it was agreed that the definitions would total between 5000 and 8000. Of this total, it is now estimated that the first report, which is scheduled for publication in the fall of 1931, will contain between 2500 and 3000 definitions. Some of the subcommittee reports are naturally at the present time much more advanced than others, several having already reached the stage where they can be set in type in galley form. All such subcommittee reports pass through several stages; they are circulated and approved first by the individual subcommittees, then circulation is extended to include the entire sectional committee under a ruling calling for comments and criticism within sixty days, and finally they are distributed in printed galley proof form. By this method, it is hoped to expedite final approval as American Standard.

In closing this résumé, it should be pointed out that this undertaking is receiving such whole-hearted support from every interested organization in the electrical and allied fields, that many of the difficulties which would ordinarily stall an undertaking of such scope have never developed, and the future augurs well for the issuance of what may be called an ac-

cepted American Standard Electrical Dictionary. In fact, the publishers of American dictionaries have intimated that they will be only too glad to accept as authoritative the work of the Sectional Committee on Electrical Definitions.

An interesting example of the work being done by the sectional committee will be found below in the report of subcommittee 3B on Control Equipment. This is the first subdivision of the work on electrical definitions to approach its final form and is, further, the first to be set in type. It will also be noted that the approved numbering system has been applied. In this system the first two digits identify the subcommittee responsible for the definition, the second two digits identify the subgroup of the subcommittee, and the final three digits the definition itself.

This committee's rapid progress has been largely due to the fact that there is an approved American Standard on the subject which contains many of the definitions included in its scope.

DEFINITIONS FOR CONTROL EQUIPMENT

Report Number 3, February 13, 1931, of Subcommittee 3B of the Sectional Committee on Electrical Definitions (C42)

The following definitions are submitted by Subcommittee 3B and constitute the third revised report on substantially all of the existing definitions which this committee has under consideration with the exception of a few which are still under discussion. The definitions marked with an (*) have the same wording as now exists in the accepted American Standard (C19) (A.I.E.E. Standard No. 15). The wording of the other definitions has been changed. Certain of the definitions may eventually be transferred to the reports of other subcommittees. This is indicated by the number of the subcommittee appearing in parenthesis directly following the title of the definition. The personnel of Subcommittee 3B is as follows: H. D. James, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., *Chairman;* T. E. Barnum, Cutler-Hammer Manufacturing Company; M. G. Lloyd, Bureau of Standards; E. M. Bouton, Westinghouse Electric Elevator Company; R. B. Shepard, Underwriters' Laboratories; W. C. Yates, General Electric Company. The sponsor of the Committee is the American Institute of Electrical Engineers.

Any comments on the report should be sent to the chairman of the subcommittee.

Electric Controller *25.05.005

An electric controller is a device, or group of devices, which serves to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected.

Semi-Magnetic Controller *25.05.015

A semi-magnetic controller is a controller having part of its basic functions[1] performed by electromagnets, and part by other means.

Manual Controller 25.05.020

A manual controller is a controller operated by hand.

Drum Controller *25.05.025

A drum controller is a controller which utilizes a drum switch as the main switching element.

NOTE: A drum controller usually consists of a drum switch and a resistor.

Starter *25.05.030

A starter is a controller designed for accelerating a motor to normal speed in one direction of rotation.

NOTE: A device designed for starting a motor in either direction of rotation includes the additional function of reversing and should be designated a controller.

Automatic (15) 25.05.035

Automatic means self-acting, operating by its own mechanism when actuated by some impersonal influence—as, for example, a change in current strength; not manual, without personal intervention. Remote control that requires personal intervention is not automatic, but manual.

Automatic Starter 25.05.040

An automatic starter is a starter designed to automatically control the acceleration of a motor during the acceleration period.

Auto-Transformer Starter *25.05.045

An auto-transformer starter is a starter having an auto-transformer to furnish a reduced voltage for starting. The device includes the necessary switching mechanism and is frequently called a compensator or auto-starter.

Contact 25.05.050

Contact is the junction of two conducting parts through which current passes.

Contact 25.05.055

A contact is a conducting part which co-acts with another conducting part to complete or to interrupt a circuit.

Switch *25.05.065

A switch is a device for making, breaking, or changing the connections in an electric circuit.

[1] By basic functions is usually meant acceleration, retardation, line closing, reversing, etc.

Motor-Circuit Switch 25.05.080

A motor-circuit switch is a switch intended for use in a motor branch circuit. It is rated in horsepower and is capable of interrupting the maximum operating overload current of a motor of the same rating at the rated voltage.

Drum Switch *25.05.085

A drum switch is a switch having electrical connecting parts in the form of fingers held by spring pressure against contact segments or surfaces on the periphery of a rotating cylinder or sector.

Master Switch 25.05.090

A master switch is a switch which serves to govern the operation of other switches.

Contactor *25.05.095

A contactor is a device for repeatedly establishing and interrupting an electric power circuit.

Magnetic Contactor *25.05.100

A magnetic contactor is a contactor actuated by electro-magnetic means.

Resistance (1) *25.05.105

Resistance is the opposition offered by a substance or body to the passage through it of an electric current and converts electric energy into heat. Resistance is the reciprocal of conductance.

Resistor (1) *25.05.110

A resistor is a device used primarily because it possesses the property of electrical resistance. A resistor as used in electric circuits for purposes of operation, protection or control, commonly consists of an aggregation of units.

Resistive Conductor (1) *25.05.115

A resistive conductor is a conductor used primarily because it possesses the property of electrical resistance.

Constant Torque Resistor *25.05.120

A constant torque resistor is a resistor for use in the armature or rotor circuit of a motor in which the current remains practically constant throughout the entire speed range.

Fan Duty Resistor *25.05.125

A fan duty resistor is a resistor for use in the armature or rotor circuit of a motor in which the current is approximately proportional to the speed of the motor.

Kinds of Protection

Low (or under) Voltage Protection *25.10.005

Low (or under) voltage protection is the effect of a device operative on the reduction or failure of voltage to cause and maintain the interruption of power to the main circuit.

Low (or under) Voltage Release *25.10.010

Low (or under) voltage release is the effect of a device, operative on the reduction or failure of voltage, to cause the interruption of power to the main circuit but not to prevent the re-establishment of the main circuit on return of voltage.

Phase-Failure Protection 25.10.015

Phase-failure protection is the effect of a device operative upon the failure of power in one wire of a polyphase circuit, to cause and maintain the interruption of power in all the wires of the circuit.

Phase-Reversal Protection 25.10.020

Phase-reversal protection is the effect of a device operative on the reversal of the phase-rotation in a polyphase circuit, to cause and maintain the interruption of power in all the wires of the circuit.

Overload Protection 25.10.025

Overload protection is the effect of a device operative on excessive current, but not necessarily on short-circuit, to cause and maintain the interruption of current flow to the device governed.

Relays

Relay *25.15.005

A relay is a device that is operative by a variation in the conditions of one electric circuit to effect the operation of other devices in the same or another electric circuit.

Phase-Rotation Relay *25.15.015

A phase-rotation relay is a relay which functions in accordance with the direction of phase rotation.

Current Relay *25.15.020

A current relay is a relay which functions at a predetermined value of current. A current relay may be either an over-current relay or an under-current relay.

Overload Relay *25.15.025

An overload relay is an over-current relay in the circuit of a motor which functions at a predetermined value of the current to cause the disconnection of the motor from the line.

Voltage Relay *25.15.030

A voltage relay is a relay which functions at a predetermined value of voltage. A voltage relay may be either an over-voltage relay or an under-voltage relay.

Differential Relay *25.15.035

A differential relay is a relay which functions by reason of the difference between two quantities such as current or voltage, etc.

NOTE: This term includes relays heretofore known as

"ratio balance relays," "biased relays," and "percentage differential relays."

Frequency Relay *25.15.040

A frequency relay is a relay which functions at a predetermined value of frequency. A frequency relay may be either an over-frequency relay or an under-frequency relay.

Open-Phase Relay *25.15.050

An open-phase relay is a relay which functions by reason of the opening of one phase of a polyphase circuit.

Step-Back Relay *25.15.055

A step-back relay is a relay which operates to limit the current peaks of a motor when the armature or line current increases. A step-back relay may, in addition, operate to remove the cause of the limitation to the current peaks of a motor when the armature or line current decreases.

NOTE: When used with a motor having a fly-wheel, the relay causes the momentary transfer of stored energy from the fly-wheel to the load; but does not limit the current peaks if the load is sustained for a considerable interval after the relay operates.

Qualifying Terms

Notching (15) 25.20.005

Notching is a qualifying term indicating that a predetermined number of separate impulses are required to complete operation.

Inverse Time (15) *25.20.010

Inverse time is a qualifying term indicating that there is purposely introduced a delayed action, which delay decreases as the operating force increases.

Definite Time (15) 25.20.015

Definite time is a qualifying term indicating that there is purposely introduced a delay in action, which delay remains substantially constant regardless of the magnitude of the quantity that causes the action.

Instantaneous (15) 25.20.020

Instantaneous is a qualifying term indicating that no delay is purposely introduced in the action of the device.

Properties and Characteristics of Apparatus

Distinctive Features (15) *25.25.005

Distinctive features are exclusive elements of a design which are characteristic or which are not common to other designs.

Air (Used as a Prefix) (15) *25.25.010

The prefix "air" applied to a device which interrupts an electric circuit indicates that the interruption occurs in air.

Oil (Used as a Prefix) (15) *25.25.015

The prefix "oil" applied to a device which interrupts an electric circuit indicates that the interruption occurs in oil.

Tight (Used as a Suffix) (15) *25.25.020

Apparatus is designated as water tight, dust tight, etc., when so constructed that the enclosed case will exclude the specified material.

Proof (Used as a Suffix) (15) *25.25.025

Apparatus is designated as splash proof, dust proof, etc., when so constructed, protected or treated that its successful operation is not interfered with when subjected to the specified material or condition.

Resistant (Used as a Suffix) (15) 25.25.030

Apparatus is designated as moisture resistant, fume resistant, etc., when so constructed, protected, or treated that it will not be readily injured when subjected to the specified material.

Dust Proof Apparatus (15) *25.25.035

Dust proof apparatus is apparatus so constructed or protected that the accumulation of dust will not interefere with its successful operation.

Dust Tight Apparatus (15) *25.25.040

Dust tight apparatus is apparatus so constructed that the dust will not enter the enclosing case.

Drip Proof Apparatus (15) *25.25.045

Drip proof apparatus is apparatus so constructed or protected that its successful operation is not interfered with when subjected to falling moisture or dirt.

Drip Tight Apparatus (15) *25.25.050

Drip tight apparatus is apparatus so protected as to exclude falling moisture or dirt. Drip tight apparatus may be semi-enclosed apparatus if it is provided with suitable protection integral with the apparatus, or so enclosed as to exclude effectively falling solid or liquid material.

Splash Proof Apparatus (15) *25.25.055

Splash proof apparatus is apparatus so constructed and protected that external splashing will not interfere with its successful operation.

Water Tight Apparatus (15) *25.25.060

Water tight apparatus is apparatus so constructed that a stream of water from a hose (not less than 1 in. in diameter) under a head of about 35 ft and from a distance of about 10 ft can be played on the apparatus for several minutes without leakage.

Weatherproof Apparatus (15) *25.25.065

Weatherproof apparatus is apparatus so con-

structed or protected that exposure to the weather will not interfere with its successful operation.

Sleet Proof Apparatus (15) *25.25.070

Sleet proof apparatus is apparatus so constructed or protected that the accumulation of sleet will not interfere with its successful operation.

Submersible Apparatus (15) *25.25.075

Submersible apparatus is apparatus so constructed that it will operate successfully when submerged in water under specified conditions of pressure and time.

Gas Proof Apparatus (15) *25.25.080

Gas proof apparatus is apparatus so constructed or protected that the specified gas will not interfere with its successful operation.

Gas Tight Apparatus (15) *25.25.085

Gas tight apparatus is apparatus so constructed that the specified gas will not enter the inclosing case under specified conditions of pressure.

Moisture Resistant Apparatus (15) 25.25.090

Moisture resistant apparatus is apparatus so constructed or treated that it will not be readily injured by a moist atmosphere. Such apparatus shall be capable of operating in a very humid atmosphere, such as that found in mines, evaporating rooms, etc.

Acid Resistant Apparatus (15) 25.25.095

Acid resistant apparatus is apparatus so constructed that it will not be readily injured by acid fumes.

Fume Resistant Apparatus (15) 25.25.100

Fume resistant apparatus is apparatus so constructed that it will not be readily injured by the specified fumes.

Design Details

Pick-Up Voltage (or Current) 25.30.015

The pick-up voltage (or current) is the voltage (or current) at which a magnetic contactor starts to close.

Sealing Voltage (or Current) 25.30.020

The sealing voltage (or current) is the voltage (or current) necessary to seat the armature of a magnetic contactor from the position at which the contacts first touch each other.

Sealing Gap *25.30.025

The sealing gap is the distance between the armature and the center of the core of a magnetic contactor when the contacts first touch each other.

Drop-Out Voltage (or Current) 25.30.030

The drop-out voltage (or current) is the voltage (or current) at which the contacts of a magnetic contactor open.

Duty and Service Qualifications

Duty of a Controller *25.35.005

The duty of a controller means the specific function or functions which it is designed to accomplish with respect to the operation of the motor; such as, starting, speed control, reversing and stopping; and in addition, the frequency and length of time of operation.

Continuous Duty *25.35.010

Continuous duty is a requirement of service which demands operation at substantially constant load for an unlimited period.

Intermittent Duty *25.35.015

Intermittent duty is a requirement of operation or service consisting of alternate periods of load and rest so apportioned and regulated that the temperature rise at no time exceeds that specified for the particular class of apparatus under consideration.

Periodic Duty *25.35.020

Periodic duty is a requirement of service which demands operation for alternate periods of load and rest in which the load conditions are well defined and recurrent as to magnitude, duration and character.

Varying Duty *25.35.025

Varying duty is a requirement of operation or service in which the apparatus is called upon to run at loads and for periods of time, which may be subject to wide variation, but which are in no case sufficient to cause the maximum temperature rating to be exceeded. In no case shall the no-load losses be sufficient to cause the maximum temperature rating to be exceeded in any part under no-load continuous operation.

Rating *25.35.030

(a) A rating of a machine, apparatus or device is an arbitrary designation of an operating limit.

NOTE: A rating is arbitrary in the sense th.. it must necessarily be established by definite fixed standards and cannot, therefore, indicate the safe operating limit under all conditions that may occur in service.

(b) For the purpose of this section the rating of a controller is based upon the power governed, the duty, and the service required. Standard ratings do not provide for overload capacity.

Miscellaneous Terms

Interlock *25.40.025

An interlock is a device actuated by the operation of some other device with which it is directly associated, to govern succeeding operations of the same or allied devices.

NOTE: Interlocks may be either electrical or mechanical.

Grounded Parts (15) *25.95.005

Grounded parts are those parts which are so connected that, when the installation is complete, they are in electrical connection with the earth.

Magnet Brake *25.95.010

A magnet brake is a friction brake controlled by electro-magnetic means.

Control Circuit Transformer *25.95.020

A control circuit transformer is a voltage transformer utilized to supply a voltage suitable for the operation of shunt coil magnetic devices.

Controller Wiring Diagram *25.95.025

A controller wiring diagram is a diagram showing the electrical connections between the parts comprising the controller, and indicating the external connections.

External Controller Wiring Diagram *25.95.030

An external controller wiring diagram is a diagram showing the electrical connections between the controller terminals and outside points; such as connections from the line, to the motor, and to auxiliary devices.

Controller Construction Diagram *25.95.035

A controller construction diagram is a diagram indicating the physical arrangement of parts such as wiring, buses, resistor units, etc.

NOTE: A diagram showing the arrangement of grids and terminals in a grid type resistor.

Elementary Controller Wiring Diagram 25.95.040

An elementary controller wiring diagram is a diagram using symbols and a plan of connections to illustrate, in simple form, the motor circuits and the scheme of control.

Control Sequence Table 25.95.045

A control sequence table is a tabulation of the connections which are made for each successive position of the controller.

Fuse (15) *25.95.050

A fuse is an over-current protective device with a circuit opening fusible member directly heated and destroyed by the current passing through it.

Thermal Cutout *25.95.055

A thermal cutout is an over-current protective device that contains a heater element in addition to and affecting a fusible member which opens the circuit.

NOTE: The heater element may be a coil, a resistive conductor, or any heat producing means responding to the current.

Barrier *25.95.060

A barrier is a partition for the insulation or isolation of electric circuits or electric arcs.

Approve Scope of Project for Coal Mine Cars

The formal scope for the work of the committee which will establish specifications for coal mine cars (M21) has been approved by the Standards Council. The scope will be:

Design and materials of construction for some of the details of coal mine cars.

It has been stated that there are over $200,000,000 worth of mine cars in operation in the coal industry, which are manufactured in more wasteful variety than any other item of equipment used underground in coal mines due to the lack of standards on the subject. It has been felt by the sponsor for this work, the American Mining Congress, that it would be impossible successfully to pursue at the present time a project involving the complete standardization of coal mine cars; it is believed, however, that a start should be made in the standardization of some of the details of design and materials of construction which will fit into and form a basis for complete standardization.

Committee Considers Standardizing Wrenches

The desirability of standardizing box wrenches and socket wrenches was recently brought to the attention of ASA by the Detroit Edison Company. The matter was referred by ASA to the American Society of Mechanical Engineers (A.S.M.E.) as one of the joint sponsors for the project on Bolt, Nut, and Rivet Proportions (B18), as the subject in question is closely related to the work of subcommittee 2 of this sectional committee dealing with wrench head bolts and nuts and wrench openings. The A.S.M.E. has submitted the suggestion to this subcommittee, with the result that it has declared its willingness to give the subject consideration, although recognizing certain difficulties in the problems involved.

Dry Cleaning Industry Sees Need for Safety Regulations

The announcement of safety regulations by states and municipalities has in the past frequently met with opposition from the industries for which the regulations were designed. Sometimes the industries wished to prepare and administer their own regulations; they felt that any action by a governmental body was an unnecessary and injurious interference with the conduct of their business. This attitude has been changing, however, with the progress of the national safety code movement, participated in by both industries and regulatory officials. A statement typical of this new attitude was printed in the December 30 issue of the *Pacific Dry Cleaner* of San Francisco. The statement follows:

"One of the most important of the questions that have been brought up before the state and sectional dyeing and cleaning associations is the question of safety and the application of safety features to dry cleaning machines. This, in connection with the regulatory laws that are being put in force throughout the country, has brought the dry cleaning industry to the realization of the necessity of looking into the future when building new plants, or purchasing new machines.

"As far as regulatory laws and safety codes are concerned, it is an easy matter to see the handwriting on the wall. Five years ago very few of the states had any laws or codes governing the location, building, and equipping of dry cleaning plants. Today it is a different story. State after state is adding a strict building and safety code to cover the dry cleaning industry to its ever-increasing list. In states where such codes do not exist many of the cities and municipalities have local ordinances governing the location, construction, and equipping of cleaning plants.

"In a recent state association meeting in a state that had just adopted a code governing safety features on dry cleaning machines, the question was brought up about equipping their plants and machines with safety devices to conform to the newly adopted code. This is a situation that bears considerable thought—a situation every dry cleaner can avoid by looking ahead and building and equipping for the future.

"The purpose behind these regulatory laws and codes is to put the dry cleaning industry on a firmer foundation—to take it out of the haphazard class and rank it with the leading industries of the country. Therefore, these laws regulating the location, building, and equipping of plants, as well as the safety codes, must not be looked upon as hindrances, but as helps."

Committee on Certification Is Appointed

The special committee of the ASA Board of Directors on Certification and Labeling, the authorization of which by the Board was announced in the August and November, 1930, issues of the ASA BULLETIN, has now been appointed. It will have as members:

Howard Coonley

Howard Coonley, Walworth Company, Boston, Mass., *chairman*

George K. Burgess, U. S. Bureau of Standards, Washington, D. C.

C. L. Collens, Reliance Electric & Engineering Company, Cleveland, Ohio

F. E. Moskovics, Improved Products Corporation, New York, N. Y.

The appointment of a special committee was first contemplated as a result of the request of the National Electrical Manufacturers Association that the American Standards Association give consideration to the "Certification Plan" advocated by the Bureau of Standards to popularize the products which manufacturers certify to be in accordance with specifications. The appointment of a committee to study the subject was authorized by the Board of Directors, but it was decided that the formation of a general committee should await a preliminary study of the subject by a committee of the Board.

ASA Approves Personnel of Sectional Committee on Industrial Sanitation

The personnel of the sectional committee which will develop the Safety Code for Industrial Sanitation (Z4) was completed with the approval of the committee by the Standards Council at its March 12 meeting.

The scope of the project will cover:

> General sanitary requirements of industrial plants, construction operations, and temporary labor camps, including water supply, drainage, sanitary conveniences, disposition of refuse and waste.

The U. S. Public Health Service, as sponsor for the project, has prepared a tentative draft for the consideration of the sectional committee. It is expected that the committee will meet to elect officers and proceed with its work in the very near future.

The personnel of the committee as approved by Standards Council is as follows:

American Atmos Company—C. A. Purcell

American Electric Railway Association—R. C. Cram (Third Avenue Railway Company)

American Gas Association—C. C. Winterstein (United Gas Improvement Company)

American Institute of Architects

American Public Health Association—Emory R. Hayhurst, M.D. (Ohio State University)

American Railway Association, Medical & Surgical Section—G. G. Dowdall, M.D. (Illinois Central Railway)

American Society of Civil Engineers—Geo. W. Fuller (Fuller & McClintock); C. A. Emerson, Jr. (Fuller & McClintock) *alternate*

American Society of Sanitary Engineers—Thomas M. Dugan (National Tube Company)

American Telephone & Telegraph Company—L. D. Bristol, M.D.

American Association of Industrial Physicians and Surgeons

Association of Governmental Officials in Industry of the United States & Canada—T. C. Eipper (N. Y. Department of Labor)

Conference Board of Physicians in Industry—C. H. Watson, M.D. (American Telephone & Telegraph Company)

Connecticut Department of Public Health—Albert Gray, M.D.

Consumers' League of New York—Mrs. Elinore M. Herrick

Crane Company—R. H. Zinkil

Kaustine Company, Inc.—J. Warren Fortenbaugh

Kohler Company—W. J. Ireland

Massachusetts Department of Labor—John P. Meade (Department of Labor and Industries)

Metropolitan Life Insurance Company—A. J. Lanza, M.D.

National Bureau of Casualty and Surety Underwriters—Holger Jensen (Maryland Casualty Company)

National Association of Mutual Casualty Companies—H. M. Torrey, M.D. (Michigan Mutual Liability Company)

National Electric Light Association—E. W. Gorry (United Electric Light and Power Company); Alexander Maxwell (National Electric Light Association) *alternate*

National Safety Council—Harry A. Schultz (U. S. Steel Corporation); C. O. Sappington, M.D. (National Safety Council)

New Jersey Department of Labor—John Roach; George J. Speidel, *alternate*

New York Department of Labor—John Vogt; C. T. Graham-Rogers, *alternate*

Pennsylvania Department of Labor and Industry—John Campbell; S. W. Homan, *alternate*

San-Equip, Inc.—K. D. Jaquith; W. A. Hardenbergh (Public Works Magazine) *alternate*

U. S. Bureau of Mines—R. R. Sayers, M.D.

U. S. Department of Labor—George H. Cartlidge (National Brotherhood of Operative Potters); J. J. Manning (American Federation of Labor); D. C. Dow (United Association of Plumbers and Steam Fitters of the U. S. and Canada)

U. S. Public Health Service—Roy R. Jones, M.D.

U. S. Navy Department—Capt. Wm. H. Bell (MC) (Bureau of Medicine and Surgery, U. S. Navy Department); W. P. Biggs (Secretary's Office, U. S. Navy Department) *alternate*

U. S. War Department—Major E. A. Noyes

U. S. Women's Bureau—Mrs. Ethel L. Best